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V.

MISCELLANEOUS BOTANICAL CONTRIBUTIONS.

By Asa Gray.

Presented, Oct. 12, 1875.

The following notes and characters relate mainly to Californian botany, the writer having been engaged in the preparation of the *Gamopetalæ* for Professor Brewer's Botany of California, now printing. Some of the observations are such as could not well be recorded in that work; and the characters of certain new genera and species may appropriately be introduced to the botanical world in a continuation of the "Contributions" which have from time to time been communicated to the Academy, and published in its Proceedings. My first note has reference to two plants of the Atlantic United States, which have long been confounded.

Sedum pusillum Michx. Glauco-pallidum, 1–3-unciale; foliis alternis teretiusculis oblongis (lin. 2–3-longis); floribus ad summitatem ramorum laxe cymosis tetrameris; pedicellis petala alba oblongo-ovata acutiuscula subæquantibus; folliculis elongato-oblongis stylo brevissimo subito apiculatis; seminibus ovali-oblongis. — On granite rocks; Flat Rock near Camden, South Carolina, Michaux; Stone Mountain, Georgia, W. M. Canby, 1869, and A. Gray, 1875. This little plant I found on Stone Mountain, in great abundance from the base to near the summit, in full blossom on the 19th of April last. Fruiting specimens were sparingly collected at the same station in May, 1869, by Mr. Canby, who, however, did not distinguish it from *Diamorpha pusilla* Nutt., which accompanies it, but is most abundant towards and upon the summit of this singular granitic mountain. I cannot learn that the true *Sedum pusillum* has been elsewhere seen, except, long ago, by Michaux. But the two are probably associated at other stations. At least they must be so at Flat Rock. For there Nuttall collected, in winter, old fruiting specimens of the plant he described in his Genera Plantarum, p. 110, as "*Tillæa? cymosa* (*Sedum pusillum* Michx.)," and on p. 293 as "*Diamorpha pusilla* (*Sedum pusillum*

Michx.)." Until now no one has supposed that there were two plants in question, because no botanist had been attracted to them by seeing the two plants in flower together. The specimens in Michaux's herbarium are in fruit, or mainly so, but the phrase "flores albi octandri" is appended to the character in the Flora. Michaux might have collected and confounded the two; but Professor Bureau, who kindly compared specimens for me, informs me that the *Sedum* in the herbarium of Michaux is unmixed with *Diamorpha*. The two plants are different enough in aspect as well as in botanical characters. The *Sedum* is the larger, earlier to blossom, of a pale and glaucous hue, and, with its profusion of pure white flowers, is more conspicuous, even showy; the pods are abruptly pointed with a very short style, have the introrse dehiscence proper to the genus, and the seeds are oblong.

The *Diamorpha*, of barely half the size, and with proportionally wider leaves, has a dull purplish hue, extending more or less to the flowers; the sepals are distinct nearly to the base and narrower; the petals oval and obtuse; the ovaries and pods tapering from a broader base into a subulate style; the seeds round-oval; and the cruciform union of the pods at base and their peculiar dorsal valvular dehiscence, peculiar to the genus, are as described by Nuttall.

With these two plants was associated another rarity; viz., the *Arenaria brevifolia* of Nuttall, in full blossom at the same season. Mr. Canby also collected it, and very naturally took it for *Arenaria glabra* Michx., to which, indeed, it is too closely related, but is probably distinct.

Cleomella oocarpa. Diffusa, spithamæa ad subpedalem; foliolis oblongo-linearibus; racemo sæpissime densifloro; bracteis inferioribus foliis conformibus, superioribus simplicibus; setulis stipularibus manifestis; staminibus petala superantibus; ovario apice 3-ovulato; capsula ovata lineam longa stylo breviusculo superata stipite (pedicellum subæquante) triplo breviore; seminibus 1–2 lævibus. — Sterile saline plains of Humboldt County, Nevada, Torrey, A. Gray; and adobe hillsides and plains on the borders of the Mesa Verde, South-west Colorado, T. S. Brandegee, in Hayden's Exploration, 1875. This has been confounded with *C. plocasperma*, Watson, Bot. King Exp. p. 33, which, thus far, has been collected only by Mr. Watson and the Rev. R. Burgess, and has a larger and dilated rhombic pod, on a stipe which generally little exceeds it in length, more numerous and laterally inserted ovules, seeds with peculiar marking, shorter stamens, &c.

POLYGALA ACANTHOCLADA. Fruticulosa, bipedalis, ramosissima, subcinereo-pubescens, spinis gracilibus armata; foliis lineari-spathulatis rigidulis (lin. 3–4 longis); floribus subaxillaribus sparsis albidis lin. 2 longis pedicello basi bibracteato parum brevioribus; alis obovatis sepalis cæteris duplo majoribus corollam adæquantibus; carina breviter cymbiformi nuda dorso umbonata. — Sides of bluffs, on the San Juan River, in the south-eastern border of Utah, T. S. Brandegee, in Hayden's Exploration. Resembles *P. subspinosa* of Watson, but woody; the flowers scattered, pale, and less than half the size; the free portion of the corolla of five short and obtuse lobes nearly equal in length and little longer than the united portion, emarginate; the keel not much larger, a conical boss on the upper part of the back; no crest. Spines of the branchlets often compound. No fruit seen.

GLOSSOPETALON NEVADENSE. Cinereo-puberulum; foliis ovalibus e basi squamacea dilatata manifeste stipulifera; floribus tetrameris. — Northern part of Washoe County, Nevada, J. G. Lemmon and E. L. Case. An interesting addition to an anomalous genus, upon the affinity of which more light may now be thrown. I had noticed the likeness of the fruit and seed to that of the Staphyleaceous genus *Euscaphis*, and I can now bring to view other points, which altogether must exclude it from *Celastraceæ*, and in my opinion refer it to the *Sapindaceæ*, suborder *Staphyleineæ*,* notwithstanding the alternate entire leaves. Mr. Wright's original specimens of *G. spinescens* show no clear trace of stipules; but in fresh ones from Parry's Southern Utah collection (No. 27), they are evident on vigorous shoots, in the form of a setaceous-subulate cusp on each side and near the apex of the deltoid squamaceous base of the leaf. As in analogous cases, they are wanting to the fascicled leaves. As in the original specimens of *G. spinescens*, so in these, although seeds seem to be full-grown and well-formed, I find not a single developed embryo. If this should prove to be straight and the albumen wanting, I should refer the genus to *Rosaceæ* near to *Purshia;* but I expect it will turn out otherwise.

PETALOSTEMON TENUIFOLIUS. Multicaulis e radice perenni, pubescens, nunc glabratus; foliis 3–5-foliolatis; foliolis mox involutis filiformi-linearibus petiolo brevioribus parce glandulosis; spicis longius pedunculatis ex ovata demum cylindricis densifloris; bracteis ovatis caudato-aristatis cum calyce sericeo-villosis eglandulosis; corolla roseo-

* "*Staphyleæ*" Benth. & Hook. is only the plural of *Staphylea*, and *Staphyleeæ* is overcharged with vowels.

purpurea, vexillo rotundato-cordato cucullato. — Arkansas, at the crossing of Red River, Dr. Newberry; New Mexico, Mr. Dieffendorfer (ex T. C. Porter), J. T. Rothrock. Much branched, apparently a foot or less in height, bearing numerous spikes on slender peduncles: leaflets about half an inch long: spikes at first white with the silky down, in age fulvous.

GALIUM ANGULOSUM. Fruticosum, patenti-ramosissimum, hispidum; ramis insigniter costato-5–7-angulatis; foliis crebris sublinearioblongis fere eveniis, costa subtus prominula, caulinis 5–7-nis (lin. 3–4 longis), ramulorum 4–6-nis paullo minoribus, ultimis florem brevipedunculatum fulcrantibus conformibus; corolla flavescente; fructu ut videtur carnosulo vel baccato fere lævi. — Guadalupe Island, on rocky precipices in the middle of the island, Dr. E. Palmer. This species seemingly belongs to the *Relbunium* section; but only forming fruit was collected; its surface is obscurely granulate. The leaves on the crowded and divaricate branches are as long as the internodes or longer; and the ultimate whorl and its internode are just like the preceding ones, in which respect it differs much from *G. Relbun* and its near allies. The numerous ribs to the stem are remarkable, and they are visible even on portions that have become woody.

BRICKELLIA MICROPHYLLA Gray, var. SCABRA. Foliis parvulis rigidioribus papilloso- vel hirtello-scabris; pappo tantum 16–20-chæto. — Rocks, Southern Colorado, Dr. Parry, T. S. Brandegee in Hayden's Exploration, 1875.

APLOPAPPUS (ERICAMERIA) PALMERI. Fruticosus, 4-pedalis, paniculato-ramosissimus; ramis floridis nunc virgatis sursum floriferis nunc in paniculam effusam ramulosam solutis; foliis filiformibus (pollicaribus, fasciculorum brevioribus) parum punctatis; involucro turbinato, squamis lato-linearibus chartaceis granuloso-subglandulosis apicem obtusissimum versus fimbriolato-ciliatis; ligulis 3–4 flores disci 11–15 haud superantibus; acheniis breviter linearibus villosulis. — Tecate Mountains, in Lower California, twenty or thirty miles below the State boundary, Dr. E. Palmer. Allied to *A. laricifolius*, &c. Heads only four lines long.

BIGELOVIA (APLODISCUS) SPATHULATA. Ramosissima, paucipedalis, glabra, parum glutinosa; ramulis floridis brevibus foliosis; foliis (semiuncialibus) cuneato- seu obovato-spathulatis retusis integerrimis coriaceis vix punctatis eveniis, costa obscura; capitulis corymbosis (lin. 4–5-longis) 16-floris; involucri turbinati squamis coriaceis, intimis latiuscule linearibus pallidis, exterioribus sensim brevioribus cras-

sioribus viridulisque, in bracteolas pedicelli brevis transeuntibus; styli appendicibus tenui-subulatis parti stigmatiferæ latiori æquilongis; acheniis sericeo-villosis subturbinatis. — Near the entrance of the Tantillas Great Cañon, in Lower California, near the borders of the State, Dr. E. Palmer. This singularly resembles our *Aplopappus cuneatus;* but it has no trace of rays; the leaves are destitute of glutinous exudation and are obscurely when at all punctate; the scales of the involucre are not carinate; the akenes shorter and silky; and the bristles of the pappus not (as in that plant) clavellate-thickened. It must stand near to *B. Menziesii;* but the style-appendages are as in the *Chrysothamnus* section.

Bigelovia (Chrysothamnopsis, post No. 15 revisionis) Engelmanni. Spithamæa et ultra e basi fruticosa, fere glabra et viridis; foliis crebris angustissime linearibus rigidulis mucronato-acutatis patentibus (poll. 1–2 longis semilin. ad lineam latis), costa valida; capitulis sessilibus fastigiatim corymboso-glomeratis; involucro oblongo-turbinato 15–20-floro, squamis oblongo-lanceolatis cuspidato-acuminatis, exterioribus sensim brevioribus haud folioso-appendiculatis; corollis 5-dentatis; appendicibus styli breviter crassiuscule subulatis; acheniis lineari-oblongis glaberrimis. — Plains of the eastern part of Colorado, at Hugo Station on the Arkansas Pacific Railroad, Dr. Engelmann and Dr. Parry, 1874; H. N. Patterson, 1875.

Bigelovia Greenei. (Chrysothamnus, * * ← ante No. 19 revisionis.) Pedalis, glaberrima; foliis angustissime linearibus mucronatis minutim remotiuscule hirtello-ciliolatis; capitulis corymboso-fasciculatis angusto-oblongis; involucri squamis oblongis margine tenuiter scariosis apice subito caudato-acuminatis; pappo rigidulo. — Huerfano Plains, southern part of Colorado, Rev. E. L. Greene, 1872.

Diplostephium canum. (Aplostephium, ligulis paucis parvis stylo suo brevioribus, pappo simplici.) Frutex ramosus, validus, tomento implexo dealbatus; foliis spathulatis vel angusto-oblongis basi attenuatis subpetiolatis integerrimis planis e costa valida subreticulato-venosis; capitulis laxe cymosis vel subpaniculatis, primariis in dichotomiis sessilibus; involucro brevi-oblongo crebre tomentoso, squamis obtusis; floribus purpurascentibus, radii 4–6, ligula inconspicua disco breviore 2–3-dentata; disci 12–20, corollis 5-dentatis, appendicibus styli brevibus acutiusculis; acheniis linearibus subcompressis 4–5-nerviis sericeo-hirtellis; pappo e setis rigidulis plerumque æqualibus, vel perpaucis exterioribus minimis. — Guadalupe Island, off

Lower California, Dr. E. Palmer; who mentions it as "a large shrub, about four feet high, of rather loose habit, found only in the crevices of high rocky cliffs, March 28. Flowers yellow." A purple hue in the small rays is evident, and the disk-corollas seem to have turned purplish also, as they are apt to do in the heterochromous *Asterineæ*. The plant agrees so well in habit, and so nearly in character, with *Diplostephium* of South America that it may fairly be referred to that genus, some species of which are equally destitute of an outer abbreviated pappus, while some are said to want the ray altogether. The general aspect is also much that of the *Inuleæ*, an Old World group; but the anthers are completely tailless, and the appendages of the style-branches are manifest, although not strongly marked internally, the stigmatic lines not ending abruptly. Still more does it recall some of the South American *Vernoniæ* in appearance and especially in inflorescence. It seems best not to constitute genera upon single species with no more salient characters than these, but a subgeneric distinction may mark its peculiarities. The heads are barely half an inch long.

ASTER COLORADOENSIS. MACHÆRANTHERA sed perennis, nanus, tomentuloso-canescens; caulibus in caudice lignescente confertis plurimis monocephalis; foliis imis spathulatis, summis fere linearibus, omnibus argute dentatis, dentibus spinuloso-setiferis; involucri hemisphærici squamis pluriserialibus subulatis laxiusculis; ligulis 35–40 linearibus purpureis elongatis; acheniis brevibus turbinatis creberrime cano-villosis. — Colorado Rocky Mountains; in South Park, on banks, gravel-bars, or open hills, Canby, Porter, Wolf and Rothrock, Greene; and San Juan Pass in the south-western part of the State, at 12,000 feet, Brandegee. A species several times collected and passed over as a very dwarf form of *A. canescens*, from which it is wholly distinct. The tufted stems are only 2 or 3 inches high.

DICORIA BRANDEGEI. Diffusa, pube substrigulosa cinerea; foliis lanceolatis obtusis subintegerrimis; capitulis laxe racemoso-paniculatis parvis; involucri squama interna florem fœmineum fulcrante unica cæteris haud longiore achenio oblongo turgido margine calloso-dentato subdimidio breviore. — On the Rio Montezuma de San Juan, near the south-western corner of Colorado, T. S. Brandegee in Hayden's Exploration, 1875. An interesting accession to the genus, requiring considerable modification of the character, there being only one female flower; its broad subtending scale hardly enlarging, thin but not scarious or colored; the exserted and naked akene more thick, convex and angled on the back, developing on the margins only rigid blunt

teeth for the wing; paleæ of the receptacle only one or two among the male flowers. Filaments monadelphous to the top, as in *D. canescens*, and anthers pointless; the style abortive and functionless as a pollen-distributor.

FRANSERIA ILICIFOLIA. Fruticosa, hirsutula; foliis rigido-coriaceis oblongis vel ovatis basi auriculata subamplexicaulibus penniveniis et reticulato-venulosis grosse dentatis, dentibus apiceque sæpius acuminato-spinescentibus; capitulis masculis haud visis, fœmineis fructiferis globosis bilocularibus dispermis aculeis crebris longis hamatis armatis, rostris 2 aculeis haud longioribus parum crassioribus. — Great Cañon of the Tantillas Mountains, near the northern border of Lower California, Dr. E. Palmer. Flowering branches very leafy to the summit, hirsute or hispid: leaves an inch or two in length, tipped with a very sharp rigid spine; fruiting involucre half an inch in diameter, including the slender prickles, which are 2 lines long.

WYETHIA CORIACEA. Pedalis, villoso-pubescens, paucifoliata; foliis longe petiolatis coriaceis eximie reticulatis aut lato-ovatis basi nunc truncata nunc obliqua vel acuta, aut oblongis in petiolum angustatis; capitulis paucis breviter pedunculatis; involucro oblongo e squamis 5–6 oblongis lanceolatisve ligulas æquantibus vel superantibus cum interioribus perpaucis parvulis subpaleaceis; acheniis glabris, radii oblongis obcompressis, disci angustioribus prismaticis 4–5-angulatis, omnibus exaristatis. — On the Mesa Grande, 70 miles north-east of San Diego, California, Dr. E. Palmer. A remarkable dwarf species, with leaves varying from 3 to 5 inches long, and sometimes nearly as broad, on petioles 2 to 4 inches long; the broader ones with some of the lower and stronger primary veins or ribs converging to the apex, or running into false veins by anastomosis. Heads an inch or so in length. Rays 5 to 8; ligules only half an inch long. Pappus of 4 to 6 short ovate or triangular scales, a little united at base, rather unequal, one or two occasionally lanceolate or subulate and longer, but awnless.

HELIANTHUS GRACILENTUS. Perennis, tripedalis; caule ramisque gracilibus fere glabris lævibus; foliis breviusculis lanceolatis integerrimis utrinque hirtello-scabris subcinereis, inferioribus oppositis breviter petiolatis; pedunculis paucis gracilibus nudis; capitulis parvulis; involucro disco breviore, squamis inappendiculatis oblongo-lanceolatis acutis gradatim imbricatis hirtello-puberulis; ligulis 12–16 elongatis, disco fusco-flavescente; paleis apice deltoideis; achenio glaberrimo complanato pappi paleis 2 subulato-aristiformibus (corolla paullo brevi-

oribus) dimidio breviore. — California, in the mountains 45 miles north-east of San Diego, Dr. Palmer. Larger leaves 3 inches long, somewhat triple-nerved; the upper successively smaller. Disk little over half an inch in diameter; rays from two-thirds to a full inch in length.

IVA HAYESIANA. Frutescens, striguloso-puberula; caule (ad bipedalem et ultra, basi haud viso) erecto demum paniculato-ramoso; foliis integerrimis obtusis, caulinis oppositis spathulato-oblongis vel sublanceolatis in petiolum attenuatis, ramealibus bractealibusque alternis ad linearia; capitulis longe laxiuscule quasi spicatis vel racemosis; involucro e squamis circiter 5 rotundatis discretis imbricatis. — San Diego County, California; Warner's Pass, Sutton Hayes (1858); and Jamuel Valley, south-east of San Diego, Dr. E. Palmer. A well-marked species, resembling *I. cheiranthifolia* rather than *I. axillaris*. Heads numerous in elongated leafy-bracted spikes or racemes, and these in an ample panicle; the ultimate floral leaves or bracts hardly exceeding the nodding heads. In memory of the estimable discoverer, the late Mr. Sutton Hayes, whose specimens, however, were indeterminable, the heads having all fallen from their short peduncles.

ENCELIA (GERÆA) VISCIDA. Herbacea, viscido-glandulosa; caule forte bipedali (basi ignoto) ramis costaque foliorum pilis longis patulis multi-articulatis barbatis; foliis ovatis oblongisve plerumque basi auriculata vel cordata semiamplexicaulibus subserratis; capitulis ramulos breves foliatos terminantibus; involucro extus viscido, squamis exterioribus herbaceo-membranaceis lato-linearibus obtusis parum inæqualibus, intimis scariosis paleis receptaculi similibus; ligulis nullis; corollis radii pallide flavis; acheniis angusto-cuneatis calloso-marginatis biaristatis præsertim ad margines albo-villosissimis. — Near Larkens' Station, on the southern borders of California, 80 miles east of San Diego, Dr. Palmer. Head nearly three-fourths of an inch long: akenes 4 or 5 lines long, and their subulate awns 2 or 3 lines. The habit is that of a *Hulsea*, rather than of any of its congeners.

PERITYLE INCANA. Suffrutescens, procera, tomento applanato incana: foliis (etiam inferioribus?) alternis crassiusculis fere trisectis, segmentis cuneatis 2–3-fidis, lobis pauci-incisis; capitulis compluribus in cymam compositam corymbosam nudam congestis; involucro viridulo; ligulis nullis; appendicibus styli breviusculis acutiusculis; acheniis oblongis subturgidis undique villosis; pappo exaristato e squamellis plurimis angustissimis basi coroniformi-concretis. — Guadalupe Island, off Lower California, Dr. E. Palmer. On precipices inaccessible to

goats in the interior of the island, conspicuous by its very white foliage and abundant golden-yellow blossoms. A remarkable and anomalous species, but certainly of this genus, having all the characters. One of the genuine species already published is rayless. In size (probably 2 or 3 feet high), in the dense tomentum, and in the naked dense corymbs or cymes, this is peculiar. The squamellæ of the pappus are as long as the breadth of the akene.

HEMIZONIA (HARTMANNIA) FRUTESCENS. Fruticosa, erecta, ultra bipedalis, hirsutula, subviscida; ramis floridis virgatis fastigiatis foliosissimis; foliis filiformibus (pollicaribus, fasciculorum brevioribus) integerrimis raro 1–3-lobatis; capitulis thyrsoideo-racemosis (lin. 3 altis); ligulis 8–9 aureis obovato-oblongis 2–3-dentatis involucro glabriusculo æquilongis; disci floribus 10–12 receptaculi convexi paleis totidem linearibus fere discretis circumdatis; pappo e paleis 5 linearibus vel subulatis fimbriato-denticulatis. — Rocky precipices in the interior of Guadalupe Island, off Lower California, Dr. E. Palmer. Disk-akenes well-formed, but apparently sterile. This and the following are striking additions to the *Hartmannia* section of the genus.

HEMIZONIA (HARTMANNIA) FLORIBUNDA. Erecta, glandulosopubescens, forte tripedalis (basi ignota); ramis crebris foliosissimis; foliis linearibus obtusis integerrimis ($\frac{1}{4}$–$\frac{1}{2}$-pollicaribus); capitulis ramulos terminantibus paniculatis (lin. 3–4 altis); involucro creberrime glanduloso disco breviore; ligulis plus 20 majusculis biseriatis cuneatis apice 3-lobatis aurantiacis; fl. disci totidem; receptaculo parum convexo inter discum et radium paleis linearibus discretis onusto; acheniis disci plerumque fertilibus pappo e paleis 5–8 late ovatis obtusissimis integerrimis dorso margineque hirsutulis coronatis. — California, near the southern boundary, on the Fort Yuma Road, 80 miles east of San Diego, Dr. E. Palmer. Belongs to the subdivision which includes *H. angustifolia* and *H. corymbosa*.

ARTEMISIA PALMERI. (*Seriphidium*, licet receptaculum paleis onustum.) Ut videtur elata et herbacea, cinereo-puberula; foliis 3–5-partitis, ramealibus integerrimis lobisque angusto-linearibus elongatis subtus tomentoso-incanis margine revolutis; panicula amplissima floribunda; involucri squamis ovatis subscarioso-membranaceis; acheniis immaturis disco epigyno majusculo. — San Diego County, California, in Jamuel Valley, 20 miles below San Diego, Dr. E. Palmer. Habit nearly of *A. Californica*, but apparently herbaceous throughout, and with the leaves or lobes broader and flat, a line or more in diameter.

Heads a line and a half in diameter: flowers all perfect; most of them subtended by paleæ, the outer ones similar to the involucral scales, the inner shorter and smaller.

SENECIO PALMERI. Suffruticosus, tomento implexo candidissimus, ramosissimus; foliis in ramis floridis confertis oblongo-spathulatis subintegerrimis in petiolum sat gracile attenuatis; pedunculo elongato nudo corymboso-7–14-cephalo; involucro ecalyculato incano, squamis 20–30 linearibus; ligulis 12–18 ovalibus aureis; acheniis sericeo-incanis. — Abundant through the northern half of the Guadalupe Island, Lower California. One of the most conspicuous plants, about a yard high; the foliage strikingly white, and the flowers bright yellow. Heads fully half an inch high, many-flowered; rays 4 lines long.

PYRRHOPAPPUS ROTHROCKII. Gracilis; caule ultrapedali e radice fusiformi perenni? simplici vel inferne ramoso folioso mono–oligocephalo; foliis linearibus integerrimis vel basim versus parce pinnatifido-laciniatis dentatisve; pedunculo gracili fere nudo; capitulo angusto circiter 20-floro; involucri squamis exterioribus paucis subulatis adpressis; acheniis rugulosis sursum scabris; pappo maturo sordide albo! — Fisch's Ranch in Southern Arizona, at 5000 feet altitude, J. T. Rothrock, in Wheeler's Exploration, 1874.

PALMERELLA, Nov. Gen. *Lobeliacearum.*

Calycis tubus turbinatus, ovario biloculari multiovulato adnatus; limbus 5-partitus, lobis angustis æqualibus. Corollæ tubus linearielongatus (intus pubentissimus), omnino saltem superne integer; fauce nunquam dilatata; limbo patente valde inæquali, lobis 2 minoribus spathulato-linearibus, 3 majoribus oblongis basi connatis. Filamenta corollæ tubo longissime adnata, dein monadelpha et uno latere sæpius alterius adnata: antheræ oblongæ, 2 setis paucis rigidis inæqualibus vertice penicillatæ, 3 paullo majores nudæ. Cæt. *Lobeliæ.* Fructus maturus haud visus.

P. DEBILIS. Herba glaberrima, gracilis, ultrapedalis, ramosa; foliis alternis tenuibus lineari-lanceolatis integerrimis eglandulosis sessilibus 2–3-pollicaribus, floralibus sensim diminutis bracteis racemi laxi pauci–pluriflori referentibus; corollæ tubo albido $\frac{3}{4}$-pollicari, lobis læte cyaneis, 2 minoribus, majoribus lineas 3–4 longis. — Great Cañon of the Tantillas Mountains, near the northern borders of Lower California, Dr. Edward Palmer, to whom this genus is dedicated in

acknowledgment of his indefatigable and fruitful explorations of the botany of the south-western frontiers of the United States, from Arizona to the islands off Lower California, in which region he has accomplished more than all his predecessors.

The genus differs from *Lobelia* in the remarkable adnation of the stamens, as well as in the integrity of the corolla tube, at least its upper portion. It soon splits from the base upwards for a good distance, and, indeed, before withering the lower part of the corolla is much disposed to separate into five claws (liberating also the lower part of the filaments); but this occurs in many species of *Lobelia*. From *Rhizocephalum*, of Weddell, this is distinguished by the habit, the very dissimilar lobes of the corolla and its narrower throat, and the completely 2-celled ovary, which probably matures numerous minute seeds.

SPECULARIA Heister. Although the two sections made by Alph. De Candolle are untenable, since species of the Old World (*S. falcata*, for instance) have lenticular seeds, and an American one, much confounded with *S. perfoliata*, has the valvular openings of the capsule near the summit, yet the American species may be well distinguished from the European, and into two sections, by taking account of the cleistogamous flowers. These are regularly produced in our species, and not in those of the Old World. (They have recently been said to occur sometimes in *S. hybrida* and *S. falcata*, but I have not found any trace of them.) They were noticed by Linnæus in the species known to him, but were wrongly thought to be incomplete and imperfect, as Dr. Torrey remarked, when he accurately described them over half a century ago. They were what we termed precociously fertilized flowers, of necessity close-fertilized, — a term to which Mr. Darwin took objection in the instance of *Impatiens* and *Viola*, and with reason if the name stands in the way of recognition of their special adaptation to close fertilization; and the proper name of "cleistogamous" is now established. But one of our species of *Specularia*, as well as the genus *Lespedeza*, lends support to our original view, by showing close fertilized blossoms as if in various stages of arrest of development. There is a mistake in Dr. Torrey's remark (in Flora of the State of New York, 1, p. 429), that Ruiz and Pavon's plate of *Campanula biflora* represents the two kinds of blossoms. It is curious that this species should have been confounded with our common northern one, as by Alph. De Candolle in the Prodromus, and by Mr. Bentham in his recent notes upon that order in Jour. Linn. Soc. 15, p. 13. The

views which we here take may be best exhibited in a conspectus of the American species.*

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* SPECULARIÆ AMERICANÆ.

§ 1. CAMPYLOCERA. Flores dimorphi, præcociores cleistogami. Capsula elongata, valvulis infra-apicalibus dehiscens, sero saltem in præcocioribus ab apice longitudinaliter subdissiliens. Ovarium in floribus cleistogamis quandoque abortu uniloculare, placenta laterali. — *Campylocera* Nutt. in Trans. Amer. Phil. Soc. n. ser. 8, p. 257 (1843).

1. S. LEPTOCARPA. Caule virgato; foliis lanceolatis; floribus in axillis arcte sessilibus; stigmatibus 2–3; ovario in fl. cleistogamis nonnullis abortu unilocu lari calycis lobis 3–4 superato; capsulis fere cylindricis gracilibus valvulis sub apicalibus adscendentibus 1–3 pertusis, præcocioribus sæpius decurvatis raro tortis; seminibus oblongis. — *Campanula leptocarpa* Engelm. in herbariis. *Campylocera leptocarpa* & var. *glabella* Nutt. l. c. *Specularia Linsecomia* Buckley in Proc. Acad. Philad. 1861, p. 460. — Arkansas, Nuttall, Engelmann; Texas, Wright, Buckley; Colorado to the Rocky Mountains, Parry, Vasey. As to the twisting of the capsule on its axis, in the manner of *Downingia*, mentioned by Nuttall, it is hardly if at all to be seen in our specimens.

2. S. LINDHEIMERI Vatke in Linnæa, 38, p. 713. Procerior; caule erecto vel reclinato (1–3-pedali) superne nunc paniculato; foliis oblongo-lanceolatis imisve ovalibus; floribus brevi-pedunculatis vel subsessilibus magis paniculatis; stigmatibus loculisque ovarii semper 3–4; calycis lobis etiam in cleistogamis 5; capsulis angulatis basi angustatis haud curvatis tortisve valvulis 2–3 paullo infra apicem pertusis; seminibus fere orbiculatis. — W. Texas, Lindheimer, Wright, Buckley. I take this to be the "*Campanula Coloradoense*" Buckley, l. c., from his character of "stigmas 4–5" (I have seen only 4), and therefore have adopted the specific name. The seeds are described as "ellipsoid," of the preceding species "elliptical." The expanded corollas are an inch in diameter, about twice the size of those of *S. leptocarpa*. The capsules apparently are never one-celled, although the partitions separate readily from the axis, one carrying away the placenta, and there is a tendency to be septicidal. The perforations, moreover, are by valves that open from above downward, or by mere ruptures. In many of the cleistogamous flowers, the corolla has attained considerable development, so as to suggest a gradation between the two kinds.

§ 2. DYSMICODON Endl. Flores dimorphi, præcociores cleistogami calyce 3–4-lobo, normales serotini, calyce 5-lobo. Capsula brevior, aut sub apice aut infra medium pertusa. Semina lenticularia. — *Dysmicodon* Nutt. l. c. *Triodallus* Raf., ubi? *Specularia* § *Triodallus* Torr. Fl. N. Y.

3. S. BIFLORA. Caule gracili ad angulos retrorsum serrulato-hirtello vel sublævi; foliis ovatis oblongisve rariter crenulatis, superioribus lanceolatis flore fulcrato brevioribus; floribus in axillis solitariis binisve sessilibus; calycis lobis in cleistogamis brevibus ovatis vel subulatis, in normalibus lanceolato-subulatis elongatis corollam vix adæquantibus; capsulis cylindraceis subfusiformibus vix costatis, valvulis infra-apicalibus. — *Campanula biflora*, Ruiz & Pav.

ARCTOSTAPHYLOS ANDERSONII. *A. tomentosæ* affinis; ramis gracilioribus setis longis albis hispidis; foliis tenuiter coriaceis fere sessilibus glabris (costa subtus setosa excepta) viridibus oblongo-lanceolatis basi sagittato-cordatis sæpe spinuloso-serrulatis; drupis viscosissimo-hirtis. — Hills behind Santa Cruz, California, Dr. C. L. Anderson, 1873.

HESPERELÆA, Nov. Gen. *Oleacearum.*

Calyx tetrasepalus, æstivatione imbricativus, deciduus. Petala 4, spathulata, unguiculata, æstivatione apicem versus imbricata, accrescentia, decidua. Stamina 4, hypogyna, petalis alterna: filamenta subulata: antheræ oblongæ, subintrorsæ, mucronatæ. Ovarium ovoideum: ovulis in loculis binis ab apice pendulis: stylus columnaris: stigma crassum, bilobum, lobis dorso parum sulcatis. Fructus sine dubio drupaceus. — Arbor 3–4-orgyalis, glabra; foliis plerumque oppositis integerrimis oblongis coriaceis e costa valida penniveniis; paniculæ floribundæ ramis pedicellisque brevibus articulatis; floribus sulphureis hermaphroditis nunc ovario imperfecto polygamis.

HESPERELÆA PALMERI. Guadalupe Island, off Lower California; found only in a cañon on the eastern side. Leaves 2 inches or more in length. Sepals oblong, somewhat scale-like and concave, greenish becoming yellowish. Petals when full grown nearly half an inch long, pale lemon-colored; the claw about the length of the sepals and the filaments. A very marked new genus, of the Oleineous tribe, remarkable for the wholly distinct and unguiculate petals, with imbricative æstivation, and the apparently uniformly isomerous stamens.

Fl. Per. 2, p. 55, t. 200, fig. 6. *C. Montevidensis* Spreng. Syst.? ex char. *C. Ludoviciana* Torr. (ined.?). *C. intermedia* Engelm. in herbariis & ex Nutt. l. c. *Dysmicodon Californicum* & *ovatum*, Nutt. l. c. *Specularia ovata* Torr., Vatke, l. c. — S. Carolina to Arkansas, Texas, and in California; also in S. America. Singularly confounded with the next. It much more resembles *S. falcata* of the Old World, which, however, has longer calyx-lobes, and, so far as I have seen, homomorphous flowers.

4. S. PERFOLIATA A. DC. Prodr., excl. syn. nonnul.; Torr. Fl. N. Y. 1, p. 428, t. 65. *Campanula flagellaris* HBK. Nov. Gen. 3, t. 265. *Dysmicodon perfoliatum* Nutt. l. c. Subhispida; foliis rotundato-cordatis quasi amplexicaulibus; capsulis brevioribus basi angustioribus, valvulis infra medium sitis. — Canada to Texas, Oregon, Mexico, &c. *Triodallus rupestris* Raf., according to specimens in herbaria, is a depauperate and diffuse state, in which only the close-fertilized blossoms are developed.

GENTIANA NEWBERRYI. PNEUMONANTHE, nana; foliis radicalibus rosulatis obovatis vel spathulatis; caulibus floridis 2–4 circa innovationem centralem folia parvula spathulata vel sublanceolata basi connato-vaginantia (summa florem unicum stipantia) gerentibus; calycis lobis lanceolatis oblongisve tubo subæquilongis; corolla cærulescente late infundibuliformi, appendicibus plicarum bifidis vel subulato-laciniatis lobis ovatis mucronatis brevioribus; seminibus ovalibus ala lata cinctis. — *G. calycosa?* Gray in Pacif. R. Rep. 6, p. 86, non Griseb. — Oregon and California, in the Sierra Nevada, from Crater Pass (Newberry) to Mariposa County, Bolander. Related to *G. frigida*. Corolla over an inch long, pale blue, white within, and greenish-dotted. Flowering stems an inch or two in length.

GENTIANA SETIGERA. PNEUMONANTHE; caulibus sat validis (pedalibus) adscendentibus e caudice crasso foliosis; foliis inferioribus orbiculato-ovalibus, superioribus obtusissimis, summis 4 florem involucrantibus, omnibus basi connato-vaginante; calycis lobis ovalibus tubo æquilongis; corolla oblongo-campanulata, appendicibus plicarum brevibus parvulis setas capillares 2–3 lobis ovatis fere adæquantes gerentibus. — Red Mountain, Mendocino County, California, Bolander, No. 840 of Kellogg and Harford's distribution. Leaves 7 to 10 pairs on the stem, thick, an inch or less in length. Corolla an inch and a half long, and the blue lobes nearly half an inch long. Forming seeds orbicular and winged.

HALENIA ROTHROCKII. Annua, ultraspithamæa, laxiflora; foliis linearibus; corolla lutea, calcaribus subulatis divaricatis parum adscendentibus calycis lobos lineares subæquantibus. — Arizona, on Mount Graham, at 9000 feet, Dr. J. T. Rothrock, in Wheeler's Expedition, 1874.

MICROCALA QUADRANGULARIS Griseb. Whether this South American species is indigenous to California would appear uncertain as to the vicinity of San Francisco. But Dr. Bolander found it "near Mendocino, under *Pinus contorta*," where it seems unlikely to have been brought by the agency of men or cattle. Dr. Engelmann indicated to me that the stamens are inserted in the very sinuses, not below on the tube as figured by Progel in the Flora Brasiliensis. Then the stigma, as Dr. Engelmann has also shown in both species of the genus, is separable or in age actually divides into two.

GILIA LARSENI. EUGILIA, depressa, surculis filiformibus repentibus apice foliatis perennans, pubescens; foliis omnibus alternis confertis pedatim 5–7-partitis summisve trifidis, lobis lineari-oblongis

majoribus subcuneatis 2–3-fidis; floribus inter folia subsessilibus; corolla infundibuliformi violacea (semipollicari) calyce 2–3-plo longiore, lobis late ovalibus; ovulis solitariis. — California, on Lassen's Peak, J. G. Lemmon and John Larsen, 1875. Habit of the *Navaretia* section; but the lobes of the leaves and of the calyx are not even mucronate, and the flowers are sparse.

Gilia (Ipomopsis) Haydeni. Fere glabra, e basi indurata perenni vel bienni paniculato-ramosissima, pedalis; foliis linearibus, imis vix spathulatis parce pinnatilobatis dentatisve, ramealibus plerisque minimis subulatis integerrimis; paniculis subthyrsoideis floribundis calycibusque parum glandulosis; corolla cæruleo-purpurea gracili infundibulari-tubulosa (ultra-semipollicari), tubo lobis suis ovatis calyceque 3–4-plo longiore; antheris oblongo-sagittatis subsessilibus fauci insertis; ovarii loculis 8–9-ovulatis; seminibus paucis oblongis, tegumento humectato nec spirillifero nec mucilaginoso! — Mesa San Juan, southern borders of Colorado or adjacent part of Utah, T. S. Brandegee, in Hayden's Exploration of 1875. Dedicated to the indefatigable explorer and geological surveyor, in charge of this and many other successful explorations of our Rocky Mountain regions. The species has the habit and color of corolla of the *Eugilia* division, but the long narrow corolla and bractless pedicels of *Ipomopsis*.

Gilia Brandegei. Eugilia, perennis, pube glandulosa fragrante viscosissima; caulibus erectis spithamæis vel subpedalibus thyrsifloris; foliis circumscriptione linearibus pinnatisectis, segmentis plurimis sessilibus parvis aut oblongo-linearibus rarius ovalibus integerrimis aut bipartitis verticillos 3–4-foliolatos simulantibus; corolla aurea infundibuliformi-tubulosa calyce cylindraceo semiquinquefido 2–3-plo longiore, fauce parum ampliata, lobis ovalibus brevibus; ovulis in loculis paucis. — South-western part of Colorado, in San Juan Gap on the face of perpendicular cliffs, T. S. Brandegee, in Hayden's Exploration, 1875. A showy as well as most remarkable species, with trumpet-shaped golden-yellow corolla, about an inch long. Leaves 2 or 3 inches, and their divisions only one or two lines in length. The likeness of this plant in foliage, flowers, and fragrant viscosity to *Polemonium confertum* var. *mellitum* is most striking. That species is itself sufficiently anomalous in *Polemonium*, on account of its lengthened corolla; but its filaments are really declinate-curved, while they appear to be not at all so in the present plant. If this character be relinquished, nothing will be left absolutely to distinguish either *Polemonium* or *Lœselia*.

LŒSELIA Linn. § GILIOPSIS. Flores paniculati vel sparsi, ebracteati. Corollæ lobi subcuneati, apice eroso-truncati vel subtridentati. Folia angustissima nuda. (Ovula in loculis 8–10. Semina ut in spec. propriis exalata!)

LŒSELIA TENUIFOLIA. E basi frutescente multicaulis, spithamæa ad pedalem, glabella; ramis gracilibus apice laxe paucifloris; foliis fere acerosis cuspidato-mucronatis integerrimis vel inferioribus sublinearibus pauci-pinnatipartitis, lobis subulatis; calycis lobis subulatis tubo dimidio brevioribus; corolla punicea tubuloso-infundibuliformi (pollicari), tubo lobis 3–4-plo longiore; genitalibus longius exsertis. — Northern borders of Lower California, Tantillas Mountains, especially at the entrance of the Great Cañon, W. Dunn, E. Palmer. Longer leaves an inch long; the upper gradually reduced to small subulate bracts, but none at the base of the calyx. One lobe of the corolla separated from the others by deeper sinuses; the long capillary filaments (which are inserted low down on the tube) more or less declined to that side, and their summits a little incurved.

LŒSELIA EFFUSA. Spithamæa ad pedalem, e radice annua laxe ramosissima, glabella; ramis ramulisque paniculato-floribundis gracillimis rigidulis; foliis omnibus fere filiformibus mucrone apiculatis integerrimis (radicalibus evanidis); calycis dentibus brevibus latis; corolla brevi-infundibuliformi purpurea, tubo calycem paullo superante lobis inæqualibus haud longiore; genitalibus (sat declinatis apice incurvis) corollam parum excedentibus. — Tantillas Mountains, borders of Lower California, Dr. E. Palmer. Stem sometimes as if lignescent at base; but the root plainly annual. Leaves from half to a quarter of an inch long, or less. Pedicels sometimes as long as the flowers, mostly shorter than the calyx. Corolla ("pink," but in the dried specimens violet-purple) barely half an inch long, the limb rather ample and spreading, one or two lobes rather smaller and more separated. Capillary stamens inserted low on the tube of the corolla. Ovules, seeds, &c., as in the preceding.

Except for the declined stamens and some inequality of the corolla, these two species would be referred to *Gilia*, the former to the section *Ipomopsis*, the latter to *Eugilia*. But they accord with *Lœselia*, except in the total absence of dilated bracts, which, considering the case of *Gilia*, cannot be the generic character. The seeds do not supply a character. These in *Lœselia*, as remarked in the yet unpublished portion of the Genera Plantarum by Bentham and Hooker, develop mucilage when wet; the mucilage-cells are underneath a

rather firm pellicle, as in several species of *Gilia;* moreover, in no species that I have examined is there any membranaceous margin, still less a wing; the slight border which sometimes gives an appearance of one comes from the drying of the somewhat translucent mucilaginous coating. The characters which distinguish *Gilia*, *Polemonium*, and *Læselia* are by no means as definite as was supposed before such connecting forms as these and the preceding were known. But I conclude that these two plants must constitute a section of *Læselia.*

LACHNOSTOMA HASTULATUM. Gracillimum, volubile, pube densa brevi undique cinereum; foliis parvis (lin. 2–3 longis et petiolo subæquilongo) hastatis; floribus solitariis fere sessilibus; sepalis linearibus; corollæ 5-partitæ lobis lato-linearibus tantum puberulis intus glabrioribus; corona simplici asclepioidea, nempe e squamis 5 cuculliformibus apice tridentatis intus ligula brevi subulata auctis; folliculis fusiformibus parce molliter muricatis. — Cañon Tantillas, within the northern borders of Lower California, Dr. Palmer. Corolla greenish-white, only 2 lines long. Follicles nearly 2 inches long.

PHACELIA (EUPHACELIA) PHYLLOMANICA. Elata, ramosa, foliosissima, pube et brevi molli densa et superne longiore villosa canescens; foliis pinnatisectis, segmentis 17–25 crebris oblongo-linearibus pinnatifidis, lobis brevibus oblongis nunc paucidentatis; spicis thyrsoideo-congestis primum densis; floribus sessilibus; calyce e phyllis aut omnibus foliaceis pinnato-3–5-partitis aut 1–3 lato linearibus integerrimis corolla violacea parum brevioribus; plicis brevibus latissimis; staminibus subexsertis. — Var. INTERRUPTA: viridula, pube laxiore; foliis tenuioribus, segmentis paucioribus sparsioribus hinc inde ad lobulum reductis, majoribus sinuato- vel crenato-bipinnatilobatis. — A striking species of the *P. tanacetifolia* section, perhaps not an annual, destitute of hispid hairs and of glands, but rather viscid in the inflorescence; the dissected foliaceous calyx peculiar. The annular disk is very conspicuous.

EMMENANTHE PUSILLA. Exigua, piloso-pubescens; foliis crassiusculis oblongo-lanceolatis vel spathulatis integerrimis in petiolum sat gracilem attenuatis; racemo 3–7-floro laxo, primario scapiformi; corolla minima (alba?) sepalis linearibus parum spathulato-dilatatis capsulaque ovoidea obtusissima mutica dimidio breviore; stylo perbrevi; seminibus 10 valde grosseque rugosis *Microgenetis.* — Western Nevada, at Steamboat Springs, S. Watson (part of No. 878, early young plants confounded with *Phacelia pusilla*), and in the same district in

May, 1875, Lemmon. A congener of *E. glaberrima* Torr., which also appears to have a white rather than yellow corolla. Plant 1 to 3 inches high, slender. Leaves 2 to 5 lines long and with petiole of almost equal length. Peduncle and raceme filiform; pedicels mostly shorter than the calyx; the latter in flower one line, in fruit two lines long. Very short and small style deciduous from the capsule. Seeds less than half a line long.

HARPAGONELLA, Nov. Gen. *Borraginacearum.*

Calyx inequalis obliquus, e sepalis 3 a basi solutis immutatis, 2 alte connatis in cucullum fructiferum dorso glochidiatum auctis. Corolla tubo brevissimo subrotata, lobis æstivatione imbricatis, fauce fornicibus obtusis instructa. Stamina brevia, tubo inclusa: antheræ minimæ, ovatæ. Stylus brevis: stigma subcapitatum. Ovarii segmenta subglobosa, gynobasi planiusculæ affixa, duo abortiva; ovula in fertilibus erecta, anatropa, foramine infero. Nuculæ 2, collaterales, læves, oblongæ vel subclavatæ, ab areola parva adscendentes, una nuda sæpe infertilis, altera major intra cucullum calycinum 6–7-cornutum (cornibus undique patentibus setis uncinatis armatis) arcte clausa. Semen nuculæ conforme, basifixum: cotyledones ovatæ, radicula brevi infera vel centripeta. — Herba pusilla, annua, *Pectocaryæ* facie; foliis linearibus, pedunculis sparsis brevibus extra-axillaribus post anthesin deflexis, floribus minimis, corolla alba. (Benth. & Hook. Gen. Pl. 2, p. 846, adhuc ined.)

HARPAGONELLA PALMERI. — Guadalupe Island, off Lower California, 1875, Dr. E. Palmer. A slender and sparingly branched annual, 2 to 5 inches high, cinereous-hirsute. Leaves linear, an inch or less long, and the floral gradually reduced to bracts a line or two long. Peduncles in fruit a line long, stout, and strongly recurved. Calyx in flower barely a line long, 5-parted, except between two of the sepals, which coalesce to the middle; below the sinus of the coalescent divisions is an external tufted appendage, which at length develops into the soft-spiny horns. Short style slender to the base. Gynophore not elevated. The two lobes of the ovary on the side of the flower next to the three nearly separate and unchanged sepals (which we may designate the lower side of the flower) are uniformly and early abortive; the other portion of the calyx accrescent, and soon gibbous-involute into a sort of coriaceous burr, of about 2 lines in length, armed with a few (usually 7) spiny horns, of a line or two in length, which spread in all directions, and are beset for nearly their whole length

with short and very stiff backwardly hooked bristles; the burr closing on the ventral side, and completely covering a fertile nutlet: the other nutlet is free, and is certainly sometimes fertile, but more commonly, although enlarging, it seems to fail to mature a seed. The adaptive character of this little plant, viz., the transference of the burr-like apparatus for the dissemination of the seed from pericarp to the calyx, and the investment by the latter of only one of the two ripening nutlets, is most remarkable. The habit is that of *Pectocarya*, with which it is associated upon the island; but the structure is very different.

ECHIDIOCARYA, Nov. Gen. *Borraginacearum.*

Calyx 5-partitus; segmentis linearibus, fructiferis laxis. Corolla infundibuliformis, sub fauce nuda parum constricta, lobis æstivatione imbricatis. Filamenta brevissima: antheræ oblongæ. Ovarii lobi gynobasi vix elevatæ impositi: stylus brevis: stigma didymum. Nuculæ 4, latæ, ovato-pyramidatæ, inermes, subrugoso-muriculatæ, dorso ventroque carinulatæ, carina ventrali apice breviter producta, areola basilari late concava in stipitem longe producta, stipitibus infra medium per paria connexis introrsum apertis gynobasin conicam claudentibus; cicatrice lata excavata post nuculas delapsas in gynobasi relicta. Semen breve, leviter curvum: cotyledones latæ subplanæ. — Herba annua, diffusa; foliis (oblongo-linearibus) floribusque *Eritrichii* sect. *Plagiobothridi* referentibus, corolla parva alba vel cærulescente. (Char. maxima ex parte e Benth. & Hook. Gen. Pl. 2, p. 854, adhuc ined.).

Echidiocarya Arizonica. — Verde Mesa, Arizona, Dr. Smart.

Convolvulus (Calystegia) occidentalis. Aut glaber, aut minute pubescens, volubilis; foliis nunc ovato-triangularibus sinu profundo angusto nunc lanceolato-hastatis immo lineari-sagittatis, lobis posticis sæpe 1–2-dentatis; pedunculo elongato intra bracteas ovatas vel oblongas quandoque bifloro; corolla alba vel erubescente, limbo lato; stigmatibus fere linearibus. — Common throughout the western part of California, on and near the coast. The more luxuriant and broader-leaved forms so much resemble *C. sepium* that only the shape of the stigmas surely distinguishes them. But I have never seen *C. sepium* with a second flower, while this often has two, and rarely even three from the pair of bracts. The Californian species abundantly confirm Mr. Bentham's remark in the Flora Australica, that the characters of *Calystegia* are too artificial, and it may now be added too transitional, to warrant the adoption of the genus.

CONVOLVULUS (CALYSTEGIA) CALIFORNICUS Choisy, which is *Calystegia subacaulis* Hook. & Arn., has the same narrow (at most oblong-linear) stigmas, with very short or merely trailing stems, obscurely if at all hastate and obtuse leaves, and oblong or oval bracts, very similar to the outer sepals and not surpassing them.

CONVOLVULUS (CALYSTEGIA) VILLOSUS, the *C. n. sp.?* Torr. in Pacif. R. Rep. 4, p. 127, and *Calystegia villosa* Kellogg in Proc. Calif. Acad. 5, p. 17, is an allied species, usually silvery white with a dense and soft tomentum, trailing or feebly twining, and the leaves varying from reniform-hastate to sagittate, the bracts oval or ovate, and only equalling the calyx, the corolla cream-color. The following, instead of the calyx-like membranaceo-foliaceous bracts close to the calyx and enveloping it, has a foliaceous pair at some distance below.

CONVOLVULUS LUTEOLUS Gray. Aut glaber, aut pubescens, gracilis, volubilis; foliis triangulari-hastatis vel sagittatis, lobis nunc bifidis; pedunculis folio æquilongis uni- raro bifloris sub flore bracteas 2 lineares seu lanceolatas folioformes gerentibus; sepalis rotundatis; corolla pallide lutea pollicari vel longiore. — *Ipomœa sagittæfolia* Hook. & Arn., Bot. Beechey, p. 151, licet stigmatibus linearibus. Var. FULCRATUS. Magis pubescens; flore foliis hastatis vel sagittatis stipato. *C. Californicus* Torr. Pacif. R. Rep. 4, p. 127, non Choisy. — California, in various parts of the State, especially in the southern and western portions; its bracts from one to four lines long, and about the same distance below the calyx. The variety, which often much resembles *C. villosus*, abounds in the foot-hills of the Sierra Nevada, and has bracteal leaves commonly half an inch long.

CUSCUTA SALINA Engelm. is a new species added to the Californian flora: it includes *C. subinclusa* var. *abbreviata*, and *C. Californica* var.? *squamigera* of Engelmann's monograph. It affects saline soil and Chenopodiaceous plants, especially *Salicornia*, and occurs on the coast from San Francisco Bay to British Columbia.

CHAMÆSARACHA. Vide Proc. Am. Acad. 10, p. 62. As Mr. Bentham has justly remarked (Gen. Pl. 2, p. 891, ined.), this is better completely separated from the genus *Saracha;* and only three species are made out, *C. Coronopus*, *C. sordida*, and *C. nana*. *Saracha acutifolia* of Miers, which is not well described, appears to be a *Physalis*.

SOLANUM XANTI. *Pachystemonum*, *Dulcamara*, basi suffruticosa excepta herbaceum, aut subglabrum aut pilis simplicissimis sæpe

glandulosis pubescens, 1–2-pedale; ramis gracilibus subflexuosis; foliis membranaceis ovatis seu ovato-oblongis petiolatis basi subcordatis vel subcuneatis nunc integris nunc lobis lateralibus utrinque auriculatis; cymis umbelliformibus primum terminalibus pauci–plurifloris nunc furcatis; pedicellis filiformibus; corolla violacea plano-rotata angulato-subquinqueloba pollicem diametro; calyce 5-lobo, fructifero erecto sub bacca (purpurea?) globosa modice ampliato. — California, through the southern and eastern parts of the State, but extending to Sierra County, J. G. Lemmon, and to Nevada, near Carson, Anderson. It is named in honor of L. I. Xantus, one of the earlier collectors of the species. This has been confounded with *S. umbelliferum*, Dr. Bigelow's specimen from Cocomungo having been referred to that species by Torrey in the Botany of Whipple's Expedition, as was that of Anderson from Nevada, by Watson in King's Expedition. Besides other marks, the pubescence is notably different (but sometimes almost wanting), consisting of simple and few-jointed hairs, some of which are glandular. It is so variable in foliage that the following plant is probably referable to it.

Var. WALLACEI. Majus; ramis junioribus pedunculisque pilis longis pluri-articulatis viscidis villosis; cyma furcata ampliore; corolla sesquipollicem diametro læte violacea. — Island of Catalina, off San Pedro, California, Wallace. No. 586 of Coulter's Californian collection, of which my specimen wants the flowers, and which is glabrous and has cordate leaves, may be a form of this.

SOLANUM UMBELLIFERUM Esch. This variable species abounds around San Francisco and in all that part of California. Eschscholtz described a form with ovate acute leaves, but they are more commonly obtuse, and the smaller ones inclined to obovate. *S. Californicum* of Dunal is this ordinary form, and *S. genistoides* a depauperate and small-leaved summer state of the same. The species is well marked by the somewhat furfuraceous or tomentose pubescence, which, under a lens, is seen to be composed of repeatedly branching hairs.

COLLINSIA Nutt. This genus is exceedingly well marked, but the species are difficult of discrimination. Eleven species may be distinguished, of which nine are in the Californian flora, and two in the Mississippi region and eastward.*

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* COLLINSIA Nutt.

§ 1. *Confertiflorœ*, pedicellis brevibus vel subnullis. Occidentales.

* Corolla valde declinata, fauce saccata subtransversa (in tubum proprium quasi hemitropa) vix longiore quam lata: filamenta superiora basi parce barbata: glandula (rudimentum staminis quinti) parva, sessilis.

TONELLA Nutt. There are two well-marked species. Although the character of solitary ovules, assigned in Proc. Am. Acad. 7, p. 378, holds in only one of them, yet the form of the corolla — with rotately expanding lobes and the lower one open, not at all enclosing the stamens and style — appears to mark the genus as a good one. Moreover, the middle leaves are almost all 3-parted or divided. The species are: —

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1. C. BICOLOR Benth. Calycis lobis acutis; corollæ bicoloris nunc albæ fauce ventricosa valde obliqua, labio superiore quam inferius parum breviore. — *C. heterophylla* Graham, Bot. Mag. t. 3695, foliis imis trifidis. — Chiefly in the western part of California.

2. C. TINCTORIA Hartweg in Benth. Pl. Hartw. Viscidior; pedicellis brevioribus vix ullis; calycis lobis linearibus vel angusto-oblongis sæpius obtusis; corollæ (ochroleucæ, nunc albæ nunc purpureo notatæ) fauce ventricosissima transversa, labio superiore brevissimo, lobis lateralibus intus parce barbatis. — *C. barbata* Bosse in Bot. Zeit. 12, p. 905 (1853). *C. septemnervia* Kellogg in Proc. Calif. Acad. 2, p. 224, fig. 69. — Mainly in and towards the Sierra Nevada.

* * Corolla minus declinata, fauce gibbosa obliqua longiore quam lata: caules humiliores: folia plerumque crenato-dentata, crassiuscula, obtusa.

+ Filamenta pl. m. barbata: labium superius corollæ (sub lobis parum callosum) haud cristatum: calycis lobi latiores obtusi.

3. C. BARTSIÆFOLIA Benth. in DC. Puberula, subglandulosa, vel superne viscidulo-hirsuta, erecta; verticillis florum 2–5; corollæ labio superiore fauci obliquo æquilongo, lobis lateralibus emarginatis vel obcordatis; glandula sessili elongata porrecta. — *C. bicolor* var.? *parviflora* Benth. Pl. Hartw. No. 1884. *C. hirsuta* Kellogg, l. c. p. 110, fig. 34, forma hirsutior. The low transverse callosity at the junction of the limb of the upper lip of the corolla with the throat, which is visible in several species, is more evident in this; it borders a small hood-like depression.

4. C. CORYMBOSA Herder, Ind. Sem. Petrop. 1867, & Gartenfl. 1868, t. 568. Glabra vel subpuberula, decumbens; foliis carnosulis latioribus; floribus in capitulum unicum congestis; corolla bicolore rectiuscula, labio superiore brevissimo, lobis fere obsoletis; glandula parva complanata stipitata. — Coast of the northern part of California.

+ + Filamenta glabra: corollæ labium superius sub lobis fornicato-cristatum: calycis lobi angustiores acutiusculi; flores parvuli violacei.

5. C. GREENEI Gray, Proc. Am. Acad. 10, p. 75. — Lake County, California, E. L. Greene.

§ 2. *Laxiflorœ*, pedicellis elongatis aut solitariis aut umbellato-verticillatis.

* Glabræ: folia inferiora saltem radicalia rotunda vel oblonga, pl. m. dentata: calycis lobi acuti, fructiferi capsulam superantes.

1. T. COLLINSIOIDES Nutt. ex Benth. in DC. Prodr. 10, p. 593 Tenella, sparsiflora; floribus minimis; corolla calyce paullo longiore, lobis posticis et lateralibus subconformibus oblongis ab antico multo latiore sinubus profundioribus magis discretis; ovarii loculis uniovulatis. — *Collinsia tenella* Benth. in DC. Prodr. l. c. — Oregon, near the coast to Mendocino County, California, Nuttall, E. Hall, Bolander, and Kellogg.

2. T. FLORIBUNDA. Vegetior, 1–2 pedalis; racemis floribundis virgatis e verticillis 3–7-floris; corolla ampla (lin. 3–4 lata) calyce multo

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+– Orientales, lætifloræ: folia caulina plerumque ovato-lanceolata: corollæ fauce valde gibbosa labiis fere dimidio breviore: filamenta superiora inferne pl. m. barbata: glandula (in *C. verna*) subulata porrecta.

6. C. VERNA Nutt. Corolla bicolore (labio superiore albo, inferiore cæruleo) lobis tantum emarginatis. — New York to Missouri.

7. C. VIOLACEA Nutt. Corolla concolore violacea, lobis obcordato-bifidis, superioribus dimidio minoribus. — Arkansas. *Antirrhinum tenellum* is more likely to belong to this than to the preceding species.

+– +– Occidentales mediocrifloræ: corolla fauce lata ventricoso-saccata limbo pl. m. breviore: pedicelli flores subæquantes.

8. C. GRANDIFLORA Dougl. in Bot. Reg. t. 1107. Floribunda; foliis floralibus lanceolatis linearibusque plerumque 3–7-natis; verticillis 3–9-floris; calycis lobis acuminatissimis; corolla bicolore (albo-cærulea) maxime declinata, fauce in tubo fere transversa, lobis parum emarginatis, labio superiore bicalloso; filamentis glabris; glandula sessili capitata. — North-western California to Washington Territory.

9. C. SPARSIFLORA Fisch. & Meyer. Gracilis, diffusa; foliis oppositis, floralibus superioribus minimis tantum ternatim verticillatis; pedicellis solitariis binisve, summis nunc ternis; calycis lobis ovatis vel deltoideo-lanceolatis acutis; corolla vix bicolore, fauce valde obliqua; filamentis inferne hirsutis; glandula sessili elongato-subulata. — *C. parviflora* var. *sparsiflora* Benth. in DC. *C. solitaria* Kellogg, l. c. p. 10. — North-western California.

+– +– +– Boreali-occidentales, parvulæ, parvifloræ: pedicelli floribus longiores: corolla subconcolor e calyce paullo vel dimidio exserta, fauce oblongo obliquo labiis longiore: filamenta glabra: glandula capitata brevi-stipitata.

10. C. PARVIFLORA Dougl. in Lindl. Bot. Reg. t. 1802. — *C. minima* Nutt. in Jour. Acad. Philad. 7, p. 47. — From Lake Superior to California and northward.

* * Glandulosa, viscida: folia linearia, radicalia oblanceolata, omnia integerrima: calycis lobi angusti, obtusi, capsula breviores: corolla parvula, læte cærulea, calyce multo longior: filamenta glabra: glandula sessilis subulata.

11. C. TORREYI Gray, Proc. l. c. 7, p. 378. — California, through the higher region of the Sierra Nevada.

longiore; labii inferioris trisecti lobis 3 fere conformibus obovatis iis labii superioris bifidi minoribus; ovarii loculis 3–4-ovulatis. — *Collinsia grandiflora* Hook. Kew. Jour. Bot. 3, p. 298, non Lindl. Willow thickets of the Valley of the Kooskooskee, in the western part of Idaho, Spalding, Geyer. The sessile gland representing the fifth stamen is at the very base of the corolla; in the preceding species it is higher up on the tube and smaller.

PENTSTEMON BARBATUS Nutt., var. TRICHANDER. Humilior e caudice lignescente; antheris longe parceque lanoso-barbatis! — S. W. Colorado, T. S. Brandegee, in Hayden's Exploration, 1875. Mr. Brandegee was struck with this as different from *P. barbatus* in its growth and aspect; but I see no character to distinguish it from the var. *Torreyi* of that variable species, except the long hairs on the anthers, and sometimes a few on the filaments. This has not been elsewhere met with in the *Elmigera* section. But it occurs with such variability and apparent inconstancy in *P. glaber* and some allied species, that it may not be relied on here.

PENTSTEMON CLEVELANDI. *P. spectabili* quoad folia et inflorescentiam haud dissimilis; foliis superioribus arcte sessilibus nec connatis, floralibus minimis; thyrso racemiformi nudo floribundo; pedicellis breviter filiformibus; calycis parvi lobis ovatis capsulam 3–4-plo brevioribus; corolla sanguinea tubuloso-infundibuliformi (fere pollicari), fauce paullo ampliata, lobis brevibus rotundatis patentibus; filamento sterili apice dilatato hinc barbato. — Cañon Tantillas in Lower California, received from D. Cleveland in flower, and later from Dr. Palmer in fruit.

MIMULUS Linn. Having had occasion to elaborate the species belonging to the Californian flora, I have thought it best to give a synoptical view of all the known North American *Mimuli*. Some are difficult to limit, and the extent of the genus was also uncertain. There are three or four groups of species, which would necessarily rank as genera distinct from true *Mimulus*, if they were not connected by transitions. Perhaps the most marked of these is represented by two dwarf Californian annuals with long filiform tube to the corolla, and a cartilaginous capsule, the valves of which bear the half-septa and placentæ. One of them was probably the type of the genus *Eunanus* Benth. in DC. But the tube shortens and broadens in a long series of species, which at length pass into true *Mimulus*, in which the placenta sometimes partially and rarely completely divides. Equally peculiar in habit are the shrubby species or forms on which

the genus *Diplacus* Nutt. was founded. Here the two placentæ are hardly at all united in the axis, even in the blossom; which is otherwise that of a true *Mimulus*. Then there is a low annual species with short corolla and thin-walled capsule, but the placentæ dividing with the valves, which is so peculiar in wanting the angles or keels which are so conspicuous in *Mimulus* that it was referred to a peculiar section of *Herpestis*. Altogether it seems necessary to regard the whole as one polymorphous genus, and to arrange our species as in the subjoined conspectus.*

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* MIMULUS Linn.

§ 1. EUNANUS. (*Eunanus* Benth. in DC.) Herbæ annuæ, plerumque nanæ: calyx 5-dentatus, 5-angulatus, angulis dentibusque pl. m. plicato-carinatis: corolla in typicis tubo gracili elongato: stylus superne glandulosus vel pubescens: stigma aut bilamellatum, aut labiis latis petaloideo-dilatatis connatis peltatum vel infundibuliforme: capsula valvis medio septiferis placentas divisas auferentibus. — Species 11, Californicæ, habitu variæ, pube pl. m. viscida vel glandulosa.

* Capsula cartilaginea, 2–4-sulcata, sero dehiscens, basi obliqua vel gibbosa: calyx basi gibbosus, ore valde obliquo: corolla purpurea, fauce variegata vel maculosa,

+– Tubo filiformi longe exserto: flores primarii caule multo longiores. (*Œnoe* Gray in Pl. Hartw., & sect. in Bot. Calif.)

1. M. TRICOLOR Lindl. Jour. Hort. Soc. 4, p. 222, "Junio, 1849." Foliis oblongis vel sublinearibus basi attenuatis sessilibus; calyce sursum ampliore (dentibus longioribus) basi parum gibbo; corollæ labiis æquilongis, lobis consimilibus; capsula brevi-ovali seu ovata subcompressa, marginibus anticis et posticis acutis; seminibus obovatis obliquis iis subsequentium multo majoribus. — *Eunanus Coulteri* Gray ex Benth. Pl. Hartw. p. 329, "Augusto, 1849." — It is well that Lindley's name takes precedence, as there was a mistake in supposing that this species was in Coulter's collection.

Var. ANGUSTATUS. Foliis linearibus parvulis, tubo corollæ bipollicari tenerrimo. — *Eunanus Coulteri* var. *angustatus* Gray, Proc. Am. Acad. 7, p. 381.

2. M. DOUGLASII. Foliis ovatis oblongisve in petiolem contractis; calyce basi mox valde gibboso; corollæ labio inferiore abbreviato, superiore amplo erecto; capsula lineari seu lineari-oblonga tereti 4-sulcata; seminibus ovalibus modo *Eunani* utrinque apiculatis. — *M. nanus* var. β. *subuniflorus* Hook. & Arn. Bot. Beech. p. 378. *Eunanus Douglasii* Benth. in DC. Prodr. 10, p. 374. The stigma is sometimes of two very unequal lobes, as described by Bentham, sometimes of two broad and rounded unequal lobes, sometimes peltate and nearly circular, as in most of the following.

+– +– Tubo corollæ e calyce parum exserto: flores folia vix superantes.

3. M. LATIFOLIUS. Spithamæus, viscosus; foliis radicalibus exiguis ovanidis, caulinis amplis late ovatis membranaceis basi angustatis subpetiolatis;

HEDEOMA HYSSOPIFOLIA. (*Euhedeoma*, ante *H. piperitam.*) Glabella; caulibus e caudice perenni ramoso erectis gracilibus subpedali-

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calyce basi mox valde gibboso; corollæ labio inferiore superiore erecto dimidio breviore; capsula lineari-oblonga subcurvata lateribus sulcata; seminibus præcedentis. — Guadalupe Island, Lower California, Dr. E. Palmer, 1875. A near relative of the preceding, but caulescent from the first, flowering only from about the fourth node. Leaves about an inch long; corolla two-thirds of an inch long, the narrow tube little if at all exceeding the longer tooth of the calyx; stamens not very unequal; stigma of two ample ovate-oblong lips, sometimes united into a funnelform body; capsule 5 lines long, somewhat laterally compressed, the posterior edge acute, and the anterior not sulcate.

* * Capsula coriacea vel membranacea, symmetrica: calyx basi æqualis, campanulatus vel breviter oblongus: stigma sæpissime peltatum.

+ Corolla parvula, tubo tenui exserto: calycis dentes subæquales.

4. M. LEPTALEUS. Caule ramoso 1–3-pollicari; foliis e spathulato-oblongis ad lanceolata vel linearia (parum semipollicaribus); calycis campanulati dentibus ovatis seu triangularibus tubo suo multo capsula oblongo-ovata obtusa paullo brevioribus; corolla rubra, tubo filiformi sursum parum ampliato (lin. 3–5 longo), limbo obliquo (lin. 1½–3 lato). — Gravelly soil, in the Sierra Nevada, California, at 5000 feet and upwards, south of the Yosemite, Miss Dix, A. Gray, and in Sierra County, Lemmon. A tiny species. Capsule 2 lines long.

+ + Corolla majuscula, infundibuliformis, lin. 7–11 longa, tubo proprio e calyce subæquali vix parumve exserto. Species nimis affines; caule unciali ad spithamæum.

5. M. BIGELOVII. Foliis oblongis, superioribus ovatis acutis vel acuminatis; calycis dentibus e basi lata subulatis acutissimis (lin 2 longis) tubo lato-campanulato dimidio brevioribus, anticis minoribus; corolla fauce cylindracea limbo amplo rotato-patente; capsula membranacea. — *Eunanus Bigelovii* Gray in Pacif. R. Rep. 4, p. 121. — Southern part of California, and adjacent parts of Nevada to Southern Utah.

6. M. NANUS Hook. & Arn. (var. α. *pluriflorus*). Foliis obovatis ovatis oblongisve nunc lanceolatis; calycis dentibus lato-lanceolatis vel triangularibus acutis (lineam longis) tubo quadruplo brevioribus; corolla nunc rubro-purpurea nunc flava, tubo e calyce parum exserto sensim in faucem amplam dilatato; capsula chartacea. — *Eunanus Tolmiæi* Benth. l. c. *E. Fremonti* Watson, Bot. King, p. 226, non Benth. — California, especially its eastern borders, Nevada, and through the interior to the eastern borders of Oregon and the western part of Wyoming. Hooker and Arnott's specific name is retained; but most of their characters relate to *M. Douglasii*.

Var.? BICOLOR (*Eunanus bicolor* Gray, l. c. 7, p. 381), fauce corollæ subito obconica intus atro-purpurea, limbo luteo.

7. M. FREMONTI. Foliis angusto-oblongis imisve spathulatis obtusis; calycis dentibus ovatis obtusis vel acutiusculis fere æqualibus (vix lineam longis);

bus; foliis integerrimis nervosis præter infima ovalia seu oblonga parva lineari-lanceolatis, floralibus verticillastris laxe 3–5-floris brevioribus;

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corollæ rubro-purpureæ tubo incluso sensim in faucem infundibuliformem ampliato. — *Eunanus Fremonti* Benth. l. c. — Southern part of California.

+– +– +– Corolla majuscula, tubo proprio calyce inæquali obliquo incluso.

++ Genuini, corolla infundibuliformi.

8. M. PARRYI. Glabriusculus, 2–4-pollicaris; foliis oblongis oblanceolatisve integerrimis (semipollicaribus); calycis ore valde obliquo, dentibus acutis, supremo ovato tubo triplo breviore, cæteris minoribus e basi lata subulatis; corolla infundibuliformi (lin. 8 longa) aut flava aut rubro-purpurea; capsula calyce fere inclusa. — Gravelly hills, near St. George, S. Utah, Parry (coll. 1874, No. 147).

9. M. TORREYI. Viscido-pubescens, spithamæus ad pedalem; foliis oblongis vel sublanceolatis integerrimis (semi–ultra-pollicaribus); calycis ore sat obliquo, dentibus brevibus latis obtusissimis, supremo majore; corolla infundibuliformi ($\frac{1}{2}$–$\frac{3}{4}$-pollicari) rubro-purpurea; capsula chartacea. — *Eunanus Fremonti* Gray in Pacif. R. Rep. 6, p. 83, non Benth. — Common in moist grounds along the Sierra Nevada, California, from the northern part of Plumas County (where it was first collected by Dr. Newberry, in Williamson's Expedition) to Mariposa County, as also at Donner Lake, &c., by Dr. Torrey, to whose memory it is dedicated.

++ ++ Ambigui, elatiores, corolla subito ampliata e tubo perbrevi: folia nunc exserte denticulata, inferiora flores superantia.

10. M. BOLANDERI Gray in Proc. Am. Acad. 7, p. 380. Subpedalis, viscido-pubescens; foliis oblongis; calycis ore valde obliquo, dentibus lanceolatis, supremo (lin. 3 longo) tubo oblongo dimidio breviore; corolla purpurea pollicari; capsula fusiformi-subulata subcoriacea. — *M. brevipes* Gray in Pacif. R. Rep. 4, p. 120, non Benth. — Foot-hills and the lower ranges of the Sierra Nevada, Bigelow, Bridges, Bolander. Stigma sometimes bilamellate or oblique.

11. M. BREVIPES Benth. Ultrapedalis, viscido-pubescens; foliis lanceolatis linearibus imisve oblongis; calycis dentibus valde inæqualibus e basi lata acuminatis, supremo tubo late campanulato subdimidio breviore; corolla latissima flava; capsula ovata acuminata coriacea. — Only in the south-western part of California, from San Diego to Santa Barbara.

§ 2. DIPLACUS Gray. (*Diplacus* Nutt.) Corolla, calyx (angusto-prismaticus), stigma, etc., *Eumimuli:* placentæ axi vix coadunatæ: capsula (crasso-coriacea) et dehiscentia *Eunani.* Frutex glutinosus, Californicus, foliis subcoriaceis.

12. M. GLUTINOSUS Wendl.: — Var. PUNICEUS, var. LINEARIS, & var. BRACHYPUS (*Diplacus longiflorus* Nutt.), cum syn. DC. Prodr.

§ 3. EUMIMULUS. (*Mimulus* Linn., Benth. in DC.) Corolla tubo brevi vel breviusculo: calyx 5-dentatus, angulis dentibusque plicato-carinatis: stigma æqualiter bilamellatum: capsula vix sulcata, valvis coriaceis vel membrana-

calyce angusto-tubuloso vix hirtello, dentibus setaceis subincurvis, inferioribus superiora sat superantibus tubo pubero corollæ elongatæ

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cois medio septiferis columnam centralem placentiferam integram vel bifidam nudantibus. Herbæ annuæ vel surculoso-perennes.

* Orientali-Americani; foliis penninerviis; corolla violacea, tubo subincluso fauce palato fere clausa.

13. M. RINGENS Linn. — Canada to Texas.

14. M. ALATUS Solander. — S. New England to Illinois and southward.

* * Occidentales; corolla nec violacea nec cærulea,

+– Sesqui–bipollicaris, flammea vel rosea, ringens: calycis dentes subæquales: herbæ perennes: testa seminum opaca laxa. (*Erythranthe* Spach.)

15. M. CARDINALIS Dougl. Corolla coccinea, tubo parum exserto, limbo obliquo, labio superiori erecto lateribus reflexis, inferiori lobis reflexis; staminibus exsertis.

16. M. LEWISII Pursh. Corolla saturate rosea, tubo exserto, lobis patentibus; staminibus inclusis.

+– +– Corolla aut pollicaris, aut minor, nunc parva: testa seminum præter *M. luteum* tenuis et polita.

++ Foliosi, glabri vel pubentes, haud villosi.

= Calyx saltem fructifer ore obliquo, dente supremo majore: folia sæpius dilatata, aut subito aut insigniter petiolata.

17. M. LUTEUS Linn., cum varietatibus insignioribus, i. e., ALPINUS Gray, in Proc. Acad. Philad. 1863, p. 71 (*M. Tilingii* Regel, *M. cupreus* Veitch, etc.), & var. DEPAUPERATUS (*M. microphyllus* Benth., *M. tenellus* Nutt. herb.).

18. M. DENTATUS Nutt. in DC. Species sylvestris, Oregana, vix cognita, inter *M. luteum* et *moschatum* quasi media.

19. M. JAMESII Torr. & Gray, ex Benth. in DC. *M. glabrato* proximus sed distinctus videtur.

20. M. ALSINOIDES Dougl., et var. MINIMUS Benth.

21. M. LACINIATUS. Annuus, tener, glaber; caulibus diffusis; foliis oblongis vel spathulatis laciniato-pauci-dentatis lobatisve nunc hastatis uninerviis, petiolo longo filiformi; floribus minimis; calyce brevi, fructifero ovato, dente supremo maximo; corolla brevi (lin. 2 longa) flava. — California, on the South Fork of the Merced at Clark's Ranch, A. Gray.

= = Calyx ore fere æquali, dentibus subsimilibus: Californici, annui, parvuli, caulibus erectis.

a. Folia omnia petiolata.

22. M. PULSIFERÆ. Glanduloso-puberulus, viscidus; foliis ovato-oblongis seu ovato-lanceolatis imisve rotundatis parce denticulatis vel integerrimis basi acuta vel cuneata trinervatis pedunculo æquilongis; calycis tubo fructifero oblongo, dentibus brevissimis ovato-triangulatis corollæ luteæ dimidio ad-

brevioribus. — Arizona, on Mount Graham at 9000 feet, August, J. T. Rothrock, in Wheeler's Exploration. Corolla remarkably long and exserted for the genus, 7 or 8 lines long, twice the length of the calyx; upper lip 2-lobed. Leaves crowded, the main ones from half to three-fourths of an inch long, and a line wide; the parallel veins running towards the apex; the upper gradually reduced until at length shorter than the calyx; the lowest leaves much shorter, broader, and beneath with strong more or less diverging nerves.

æquantibus. — California, in the Sierra and Indian Valleys of the Sierra Nevada, Bolander, Mrs. Pulsifer-Ames. Tube of the calyx in fruit 3 or 4 lines long; corolla 5 lines long.

b. Folia præter infima sessilia.

23. M. INCONSPICUUS Gray in Pacif. R. Rep. 4, p. 120. Glaber; foliis ovatis integerrimis; calycis quasi truncati dentibus minimis; corolla aut lutea aut rosea.

24. M. BICOLOR Benth. Viscido-pubescens; foliis lineari-oblongis lanceolatisve basi attenuatis denticulatis vel parce dentatis; dentibus calycis conspicuis triangularibus; corolla sat longa lutea, labio inferiore albo. — *M. Prattenii* Durand in Jour. Acad. Philad. n. ser. 2, p. 98 (1855). Calyx sæpius purpureo guttatus.

25. M. RUBELLUS Gray. Viscido-puberulus vel glabellus; foliis a spathulato-oblongis ad linearia plerumque integerrimis, imis latioribus; calycis oblongi dentibus brevibus rotundatis; corolla calyce aut paullo aut duplo longiore lutea rubra vel purpurea. — *M. montioides* Gray Proc. Am. Acad. 7, p. 380, pro parte.

Var. LATIFLORUS S. Watson, Bot. King. (*M. montioides* Gray, l. c. pro parte.) Forma sæpius pygmæa, corolla multo majore (nunc semipollicari), tubo longius exserto, limbo amplo aureo, fauce purpureo guttata.

↔ ↔ Foliosi, villosi, visciduli; foliis omnibus petiolatis membranaceis sat latis dentatis pl. m. penniveniis; calyce æquali vel vix obliquo; corolla lutea.

26. M. FLORIBUNDUS Dougl. in Bot. Reg.

27. M. MOSCHATUS Dougl. in Bot. Reg., cum forma longiflora.

↔ ↔ ↔ Scaposi vel subscaposi, stolonibus perennantes.

28. M. PRIMULOIDES Benth. Herbula læta; floribus longissime pedunculatis aureis.

§ 4. MIMULOIDES. (*Herpestis* § *Mimuloides* Benth.) Corolla, stigma, etc., *Eumimuli:* calyx 5-fidus, campanulatus, nec prismaticus nec carinato-angulatus, lobis planis: capsula *Eunani.* Herba annua, humilis, pilis longis mollibus villosa.

29. M. PILOSUS S. Watson, Bot. King Exp. p. 225. *Herpestis* (*Mimuloides*) *pilosa* Benth. in Comp. Bot. Mag. 2, p. 57, & DC. l. c. p. 394. — The anther-cells are barely oblong, not "linear." The stigma is bilamellar, not "entire." And the plant is surely a *Mimulus,* although the calyx is peculiar in wanting the plicate angles.

CALAMINTHA PALMERI. Sect. *Acinos:* odore et facie *Hedeomæ*, annua, a basi ramosa, spithamæa, pube molli; foliis obovatis vel spathulato-oblongis in petiolum attenuatis integerrimis, floralibus decrescentibus conformibus; bracteis minimis subulatis; verticillastris 6–9-floris, superioribus folia floralia æquantibus; calyce parce hirsuto basi vix gibboso, fauce villosissima, labiis tubo brevioribus, superiore latiore fructifero recurvo patente; corolla purpurea calyce vix duplo longiore, tubo incluso; antheræ loculis parallelis, connectivo haud incrassato. — Guadalupe Island, Lower California. "Common in the interior of the island, not cropped by the goats," Dr. Palmer. Flower only 3 lines long; pedicels a line or so in length. Calyx shorter than in *C. Acinos*, in fruit less declined or ascending. Except for the four fertile stamens this plant would be referred to *Hedeoma*. The stamens are too straight and distant for a *Calamintha*, but apparently it may be referred to that polymorphous genus.

POGOGYNE TENUIFLORA. Glabriuscula, 2–4-pollicaris; ramis (dum adsunt) corymbosis; foliis spathulatis vel obovatis basi petioloque ciliis setiformibus perpaucis instructis; bracteis nudis; calycis puberuli lobis inæqualibus lineari-lanceolatis corollæ tubo filiformi dimidio brevioribus; filamentis sterilibus parvulis glandula capitellatis. — Guadalupe Island, off Lower California, Dr. E. Palmer. Corolla nearly half an inch long.

SCUTELLARIA NANA. Stolonibus filiformibus moniliformi-tuberiferis perennans, depressa, cinereo-puberula, foliosa; foliis obovatis ovatisve obtusissimis (semipollicaribus) integerrimis brevi-petiolatis flores brevissime pedicellatos æquantibus; corolla alba (semipollicari sat lata), labiis brevibus æquilongis. — N. W. Nevada, in Winnemucca Valley, near Pyramid Lake, J. G. Lemmon.

MONARDELLA Benth. A study of some new materials, and a revision of the species for the Botany of California (to which they all belong), bring to view eleven species, which may be disposed as here subjoined.*

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* MONARDELLA Benth.

§ 1. *Macranthæ laxifloræ*, nempe floribus in capitulo laxiusculo sat magnis minus numerosis: corolla e calyce longe exserta: antheræ loculis ovali-oblongis divaricatis: perennes.

1. M. MACRANTHA. Rhizomatibus repentibus cæspitosa, depressa vel procumbens, puberula vel pubescens; foliis crassiusculis ovatis obtusis (haud pollicem longis) glabratis, petioli gracili; capitulo 10–20-floro; bracteis involucrantibus

ERIOGONUM CHRYSOCEPHALUM. (*E. Kingii* var. *laxifolium* Gray, Proc. Am. Acad. 8, p. 164.) *E. pauciflоro* affinius, differt perigoniis aureis basi annulo magis prominente articulatis, involucri dentibus minus latis; foliis paullo latioribus incanis *E. multicipitis.* — Utah, in the Wahsatch Mountains, Watson, and above Spring Lake, Parry; by the latter, in full flower.

GRAYIA BRANDEGEI. Inermis, sesquipedalis, leviter furfuraceo-cinerea; foliis spathulato-linearibus; thecis minoribus flavidulis oblato-orbiculatis quandoque trialatis basi latissime retusis, alis subundulatis; ovario basilari papuloso. — Hillsides, among fragments of cretaceous sandstone, on the San Juan River, near the boundary between Colorado and Utah, T. S. Brandegee in Hayden's Exploration, August, 1875. — While pleased with an accession to this genus, and with the opportunity of associating it with the name of an excellent correspondent who discovered it, I must add that it does not much strengthen the

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ovatis oblongisve obtusis tenui-membranaceis subscariosis cum calycibus villoso-pubescentibus; corolla sesquipollicari aurantiaco-punicea, tubo calyce duplo longiore, lobis lanceolatis. — Southern part of California, on the Cuiamaca Mountains and near Julian City, D. Cleveland, E. Palmer. The calyx is three-fourths or in fruit a full inch long; the corolla sometimes two inches long. This would be very ornamental in cultivation.

2. M. NANA. Præcedenti sat similis, magis hirsuta; floribus minoribus; corolla pallida, tubo pubescente ultra calycem paullo exserta; bracteis albidis roseisve. — S. California, in the mountains behind San Diego, D. Cleveland. Calyx barely two-thirds of an inch long; the corolla-tube only a line or two longer.

§ 2. *Densiflorœ et multiflorœ:* calyce $\frac{1}{4}$–$\frac{1}{3}$-pollicari: antheræ loculis brevioribus minis divaricatis.

* Perennes, basi nunc lignescentes: corolla incarnata vel purpurea nunc pallidiore tubo calycem parum superante.

+ Pubescens seu villosa, foliis ovatis nunc oblongis.

3. M. VILLOSA Benth., cum varietatibus.

+ + Pube minuta canescens vel fere glabra; foliis angustioribus, venis inconspicuis.

4. M. ODORATISSIMA Benth. Humilis; foliis oblongo-lanceolatis brevi-petiolatis; bracteis villosis vel ciliatis; calycis dentibus brevibus triangulari-lanceolatis intus extusque hirsutis. — Also in Oregon.

5. M. LINOIDES. Pedalis, gracilis, pube imperceptibili cinerea; foliis lanceolatis seu linearibus sessilibus imisve oblongo-spathulatis; bracteis parum ciliatis; calycis dentibus angusto-lanceolatis tantum pubescentibus. — S. California, in the mountains east of San Diego, Dr. Palmer.

genus. The small thecæ, as far as seen only 3 lines broad, and with some furfuraceous puberulence (but they are far from mature, and mainly unfertilized), and the papulose cellular ovary too much remind us of *Atriplex* (incl. *Obione*). *A. Endolepis* of Watson, Rev. Chenop., p. 111 (of which I should like to form a distinct section), has as thin and complete a sac; but there are two minute teeth at its apex, and their position, along with the venation, shows that the sac is compressed laterally, i.e., formed of two flat bracts. I agree with Mr. Watson's view, that the sac of *Grayia* is obcompressed, or formed of a pair of conduplicate bracts, completely united to the very tip; and on this character (along with the inferior radicle) the genus actually rests. But this view demands the separation from *Atriplex* of a species which has always appeared like a stranger in the genus, and which I propose

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* * Annuæ, minus foliosæ; foliis integerrimis raro undulatis.

+– Corolla (carnea, rosea, vel purpurea) tubo e calyce sat parumve exserto, lobis linearibus vel lineari-oblongis.

++ Brateæ muticæ, venis plerisque a basi parallelis; calycis dentibus latiusculis muticis.

6. M. UNDULATA Benth. Glabella; foliis oblongo-spathulatis vel fere linearibus obtusis margine undulatis in petiolum attenuatis; bracteis ovatis obtusis tenui-membranaceis vel scariosis nervis simplicibus percursis (nec venulosis) calycibusque villosis; corolla rosea.

7. M. LANCEOLATA. Viridis, fere glabra, brachiato-ramosa; foliis lanceolatis vel oblongo-lanceolatis haud undulatis in petiolum gracilem attenuatis; bracteis fere foliaceis ovatis oblongisve plerumque acutis inter costas reticulato-venosis; calycis parum nervosi dentibus intus crebre extus vix hirsutis; corolla roseo-purpurea sæpius maculata. — California, from Plumas to San Diego Co.; not uncommon; has been confounded both with the preceding and the succeeding.

8. M. CANDICANS Benth. Pl. Hartw. p. 330. Pube brevi molli canescens vel cinerea, nunc laxe ramosa; foliis oblongis vel lanceolatis obtusis subito in petiolum contractis; bracteis fere scariosis ovatis obtusis, venulis parcis inter costas reticulatis; calycis nervosi dentibus intus extusque villosissimis; corolla semper brevi pallida.

++ +– Bracteæ cuspidatæ, præter costas validas tenui-scariosæ vel hyalinæ.

9. M. BREWERI Gray, Proc. Am. Acad. 7, p. 386. Habit of *Monarda fistulosa*.

10. M. DOUGLASII Benth.

+– +– Corolla (alba?) parva, tubo incluso, lobis brevibus latis: bracteæ tenui-scariosæ, candidissimæ, 7-9-nerves.

11. M. LEUCOCEPHALA Gray, Proc. Am. Acad. 7, p. 385.

to establish by itself, between *Atriplex* and *Grayia*, under the name of its discoverer, Dr. George Suckley, U. S. A., one of the naturalists of the exploration across the Continent under Governor Stevens.*

APPENDIX.

CHAPMANNIA Torr. & Gray. This genus was described from imperfect materials in the Flora of North America (1, p. 355), taken up by Mr. Bentham in his paper upon *Arachis*, and then the character added to in Fl. N. Amer. 1, p. 692, — all this upon a wrong view as to two kinds of blossoms, which Mr. Bentham subsequently corrected. Good specimens, with well developed flowers, are in Rugel's collection; and I have just received others from an esteemed correspondent, Dr. Feay of Savannah, collected on Pease River, Florida. A few particulars are added to complete or slightly correct the character as given in Bentham and Hooker's Genera Plantarum, 1, p. 517, and to bring out more prominently the differences between it and *Stylosanthes*.

The broadly obovate vexillum and alæ are only slightly unguiculate, not at all auriculate at base, but the latter nearly as equal-sided as the former. In anthesis they are widely spreading, and distant from the carina. The latter is shorter and straight (only in Rugel's specimens is there an obliquity giving the appearance as of a slight curvature); its two petals are united almost completely into an oval or somewhat obovate piece, which is not auriculate at base, very obtuse and emarginate at the apex, convolute as if into a tube, one edge slightly over lapping, or slightly open in full anthesis. The andrœcium is only half the length of the carina, which encloses it or, when it opens down the upper side, allows the anthers to project from towards its base. The

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* Subtribus EUROTIEÆ. Theca, e bracteis pl. m. conduplicatis coalitis constans, obcompressa, rarissime triptera.

1. GRAYIA. Theca nuda, integerrima, scariosa, orbiculata, plana, samaroidea, alato-marginata. Radicula infera. Flores dioici.

2. SUCKLEYA. Theca nuda, subhastata, complanata, marginibus herbaceo-cristatis, apice bidentato. Radicula supera. Flores monoici. — S. PETIOLARIS. *Obione Suckleyana* Torr. *Atriplex Suckleyana* Watson, l. c.

3. EUROTIA. Theca villosissima, turgida, nec marginata nec aristata, apice bifida. Radicula infera. Flores dioici.

4. CERATOCARPUS. Theca cuneata, obcompresso-plana, biaristata. Radicula infera. Flores monoici.

very slender filiform style, however, is longer than the carina and protrudes beyond it more or less, even before the flower opens, and continues exserted. It is evidently a case of proterogyny. Although the ten anthers are nearly alike in size and shape, the alternate ones are shorter as well as somewhat differently affixed. The ovary is not "pluri-ovulatum." That is probably a misprint of "2–3-ovulatum." At least I find only three ovules; and, answering to this, the loment is at most three-jointed. Instead of "subreniform," the seed is obovate and the radicle is projecting and straight, as described by Mr. Bentham himself in Linn. Trans. 18, p. 162. There may be a slight inflection, but it seems to be in the incumbent direction. The stipules, unlike those of *Stylosanthes*, are nearly or quite free from the petiole.